

From: Robert Helverson/R3/USEPA/US
Sent: 4/9/2012 9:53:56 AM

To: Richard Fetzter/R3/USEPA/US@EPA
CC: carney.dennis@epa.gov; heston.gerald@epa.gov; loven.Dawn@epamail.epa.gov; Kelley Chase/R3/USEPA/US@EPA; Lora Werner/R3/USEPA/US@EPA; markiewicz.karl@epa.gov
Subject: Re: Manganese Messaging Bullets

Rich, I made a few comments and suggested changes on the document, similar to Dawn's. Also, below is our discussion on manganese from the Chesapeake ATGAS 2H site health consult.

From our Chesapeake Health Consultation:

Manganese is a naturally occurring substance found in many types of rock and soil. Persons living near a coal or oil burning factory may be exposed to higher levels of manganese since it is released into air when fossil fuels are burned. Manganese can be found in groundwater as a result of its use in the production of batteries, pesticides, and fertilizers. The average levels of manganese in drinking water (**not Dimock or Pennsylvania specific!**) have been reported to range from approximately 4 ug/L to 32 ug/L (ATSDR 2008).

EPA's secondary drinking water standard for this contaminant (50 ug/L) was set for aesthetic reasons and is not health based. Manganese concentrations in Dimock exceed EPA's health advisory level for manganese of 300 ug/L. Manganese is an essential dietary nutrient. The World Health Organization (WHO) has estimated the average dietary intake of manganese to range from approximately 2 to 8.8 mg/day. The Food and Nutrition Board of the National Research Council has established "estimated safe and adequate daily dietary intake levels" for this nutrient that range from 0.3 mg/day for infants to 5 mg/day for adults (see Table 3) (IOM 2001). IOM has a tolerable upper intake level (UL) of 2-3 mg/day for 1-8 year old children, 6 mg/day for 9-13 year old children, 9 mg/day for children under 18 years of age and 11 mg/day for adults. (Note, these ULs include manganese from all sources, including food, water, and supplements.)

For most people, food is the primary source of manganese exposure. EPA has estimated that the typical human intake of manganese from food is 3.8 mg/day (ATSDR 2008). At the maximum manganese concentration detected in a private well at this site, it is possible that these tolerable upper intake levels could be exceeded depending on the levels of other dietary sources of manganese.

Table 3
Food and Nutrition Board of the National Research Council's Estimated Safe and Adequate Daily Dietary Intake Levels (ESADDIs) for Manganese

Age Range	Estimated Safe and Adequate Daily Dietary Intake Level
Birth to 6 months	0.3 to 0.6 mg/day
1 to 3 years	1.0 to 1.5 mg/day
4 to 6 years	1.0 to 2.0 mg/day
7 to 10 years	1.0 to 2.0 mg/day
Adolescents > 11 years and Adults	2.0 to 5.0 mg/day

Source: (IOM 2001)

Notes: mg/day = milligrams manganese per day

Excess exposure to manganese can be harmful to human health. It is not known whether eating or drinking too much manganese can cause manganism. There is one study indicating a statistically significant difference in neurologic test scores between people from one area with high levels of manganese in well water compared with people from another area with low levels of manganese in well water. The concentration of manganese in the water from the high concentration area ranged from 1.8 to 2.3 mg/L; however, because of other limitations this study could not be used to determine a quantitative dose response relationship for the toxicity of manganese in humans. In another report, a group of six Japanese families exposed to manganese in their well water at concentrations of approximately 14 mg/L developed manganism like symptoms (ATSDR 2008).

Although no MRLs or RfDs have been established for manganese, ATSDR has used the upper range of the Estimated Safe and Adequate Daily Dietary Intake Levels (ESADDI) for manganese of 5 mg/day to establish an interim guidance value of 0.07 mg/kg/day [(5 mg/day)/(70 kg)]. Using the maximum reported concentration of manganese at the site, an

adult would have to drink more than 12 liters of water per day before exceeding the interim guidance level. It should be noted that the interim guidance is based on what is considered to be a safe and adequate dietary intake and that adverse health effects have not been observed at these levels. The estimated exposure doses to the maximum level of manganese detected in the private wells at this site are not expected to result in adverse health effects.

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Date: 04/06/2012 01:40 PM
Subject: Manganese Messaging Bullets

Dawn/Lora/Karl/Bob:

Here's my first shot at the manganese messaging bullets for homes in week 3 who have manganese concentrations which will need to be explained. This is just a straw man document to get us started. Please feel free to propose additions, deletions, etc. I have taken the residential perspective. Once we get that written, then others can modify for press and congressional usage.

Thanks. Have a good holiday.

Rich

[attachment "Maganese Messaging Bullets.docx" deleted by Robert Helverson/R3/USEPA/US]

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